



Following the successful bid of its 1.2 GW time-block tender in January 2020, the Solar Energy Corporation of India (SECI) launched a bid of 5 GW of round-the-clock power in March 2020, marking a major transition toward system-friendly procurements of renewable energy in India that reduce generation and integration costs. The SECI tenders incorporated several learnings and global best practices on system-friendly competitive bidding provided by the Partnership to Advance Clean Energy Deployment (PACE-D 2.0 RE) program, a joint initiative of the U.S. Agency for International Development (USAID) and India's Ministry of New and Renewable Energy (MNRE).

To achieve its target of 40 percent Renewable Energy (RE) by 2030, India must significantly ramp up its rate of RE deployment. Rapid decreases in costs facilitated deployment, but additional grid integration measures are needed. However, costs are high. The Central Electricity Authority estimates that grid integration costs already make up close to half of the bid prices. System-friendly competitive procurement minimizes both generation and system integration costs by considering the system costs and benefits of RE in the award decision.

System-friendly competitive procurement can support a higher uptake of RE in three ways:

1. System-friendly competitive procurement can improve the match between power supply and demand by procuring more dispatchable RE to meet the demand, even during peak times.
2. System-friendly competitive procurement can minimize transmission costs by procuring electricity from installations that entail fewer grid integration challenges.
3. System friendly RE procurement can minimize intermittency in RE by procuring complementary firm power that reduces the need for system balancing.

ADVANCING SYSTEM-FRIENDLY COMPETITIVE PROCUREMENT

In November 2019, PACE-D 2.0 RE developed a white paper, [System-Friendly Competitive Procurement for Renewable Energy in India](#), in consultation with MNRE, SECI, Central Electricity Regulatory Commission, State Electricity Regulatory Commissions, Distribution Companies (DISCOMs), State Procurement Agencies, Power System Operation Corporation, project developers, and other sector stakeholders. Together, we examined the issues in managing the large-scale RE variable in the system and determined new and innovative procurement approaches that can help solve these challenges.



Technical experts from USAID and the PACE-D 2.0 RE Program at the Least Cost Generation for Higher Uptake of RE by DISCOMS workshop, held at SECI's offices in July 2019. Photo: Sachin George

PACE-D 2.0 RE extensively engaged SECI, the largest procurer of RE in India, in identifying system friendly approaches for RE procurement. USAID also organized a workshop, *Least Cost Generation for Higher Uptake of RE by DISCOMs*, with SECI and held several technical interactions on the same subject. Further adoption of system procurement approaches will help India scale up the adoption of cost competitive RE resources, increase the proportion of RE power in the grid, minimize the cost of RE grid integration, and reduce the load on the grid to balance a higher proportion of variable power.

According to Mr. S.K. Mishra, Director (Power Systems), SECI, "USAID workshop and presentations on 'System Friendly RE Procurement' benefited SECI in the design of two tenders of 1.6 GW capacity for procurement of round the clock RE power."

SECI'S SYSTEM-FRIENDLY TENDER

PACE-D 2.0 RE's close collaboration with SECI on the white paper and workshop led to SECI further refining its 1.2 GW RTC tender to become a system-friendly competitive procurement. The tender incorporated new considerations and innovative new requirements, such as:

- **Requiring time-based incentives** to help match RE generation with the demand curve, thus avoiding an inefficient and costly capacity addition pathway for utilities. Since RE is mostly generated during low-demand periods, DISCOMs are faced with the challenge of arranging power during high-demand periods when no or little RE is available. The tender was designed to incorporate a two-part tariff: 1) Peak tariff for high demand time blocks; and 2) Off-peak tariff for the low demand time blocks. The off-peak tariff was fixed at INR 2.88/kVWh while the peak tariff was to be discovered through reverse bidding.
- **Considering RE grid integration costs in the award decision** which vary with location. It allowed developers the freedom to choose the most cost-effective Inter-State Transmission System sub-stations across the country to interconnect.
- **Making the tender technology agnostic** which allowed developers the option of using a portfolio of technologies that delivered energy at the least cost.
- **Prescribing strict Capacity Utilisation Factor (CUF) limits** which ensured a minimum quantum of power was available for off takers like the DISCOMs. The tender specified a minimum CUF of 35 percent and penalties if the CUF fell by more than 15 percent. The provision to procure extra energy above 10 percent of the minimum CUF had a 75 percent power purchase agreement tariff.
- **Allowing the use of energy storage or any RE generation available during peak hours** to make RE more dispatchable.

NEW PARTNERSHIP WITH INDIAN RAILWAYS

The Indian Railways is accelerating its efforts to procure more RE to reduce its carbon footprint and its power costs. After its successful work with SECI, PACE-D 2.0 RE is now working with India's Railway Energy Management Company Limited (REMCL) to develop a round-the-clock power tender to run trains across states. PACE-D 2.0 RE is supporting REMCL with tender design, stakeholder consultation, and bid management support.

ABOUT PACE-D 2.0 RE PROGRAM

USAID India, in partnership with Ministry of New and Renewable Energy (MNRE), launched a two-year initiative "Partnership to Advance Clean Energy Deployment (PACE -D 2.0 RE)" in India in January 2019. The program aims to enhance the deployment of renewable energy technologies with a goal of reducing power purchase cost, increasing supply reliability, addressing energy security needs and supporting the Government of India to achieve the renewable targets. The technical assistance under this program is provided to state of Assam, Gujarat and Jharkhand in India.

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